

Ironworker (Generalist)

2015

Trades and Apprenticeship Division

Division des métiers et de l'apprentissage

Workplace Partnerships Directorate

Direction des partenariats en milieu de travail

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The Canadian Council of Directors of Apprenticeship (CCDA) recognizes this National Occupational Analysis as the national standard for the occupation of ironworker (generalist).

Background

The first National Conference on Apprenticeship in Trades and Industries, held in Ottawa in 1952, recommended that the federal government be requested to cooperate with provincial and territorial apprenticeship committees and officials in preparing analyses of a number of skilled occupations. To this end, Employment and Social Development Canada (ESDC) sponsors a program, under the guidance of the CCDA, to develop a series of National Occupational Analyses (NOAs).

The NOAs have the following objectives:

- to describe and group the tasks performed by skilled workers;
- to identify which tasks are performed in every province and territory;
- to develop instruments for use in the preparation of Interprovincial Red Seal Examinations and curricula for training leading to the certification of skilled workers;
- to facilitate the mobility of apprentices and skilled workers in Canada; and
- to supply employers, employees, associations, industries, training institutions and governments with analyses of occupations.



ACKNOWLEDGEMENTS

The CCDA and ESDC wish to express sincere appreciation for the contribution of the many tradespersons, industrial establishments, professional associations, labour organizations, provincial and territorial government departments and agencies, and all others who contributed to this publication.

Special acknowledgement is extended by ESDC and the CCDA to the representatives from the trade across Canada who contributed to the development of this document.

This 2015 edition of the NOA was reviewed, updated and validated by industry representatives from across Canada to ensure that it continues to represent the skills and knowledge required in this trade. The coordinating, facilitating and processing of this analysis were undertaken by employees of the NOA development team of the Trades and Apprenticeship Division of ESDC. The host jurisdiction of Alberta also participated in the development of this NOA.

Comments or questions about National Occupational Analyses may be forwarded to:

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STRUCTURE OF ANALYSIS

To facilitate understanding of the occupation, the work performed by tradespersons is divided into the following categories:

Blocks	the largest division within the analysis that is comprised of a distinct set of trade activities
Tasks	distinct actions that describe the activities within a block
Sub-Tasks	distinct actions that describe the activities within a task
Supporting Knowledge and Abilities	the elements of skill and knowledge that an individual must acquire to adequately perform the sub-task

The analysis also provides the following information:

Trends	changes identified that impact or will impact the trade including work practices, technological advances, and new materials and equipment
Related Components	a list of products, items, materials and other elements relevant to the block
Tools and Equipment	categories of tools and equipment used to perform all tasks in the block; these tools and equipment are listed in Appendix A

The appendices located at the end of the analysis are described as follows:

- | | |
|--|--|
| Appendix A —
Tools and
Equipment | a non-exhaustive list of tools and equipment used in this trade |
| Appendix B —
Glossary | definitions or explanations of selected technical terms used in the analysis |
| Appendix C —
Acronyms | a list of acronyms used in the analysis with their full name |
| Appendix D —
Block and Task
Weighting | the block and task percentages submitted by each jurisdiction, and the national averages of these percentages; these national averages determine the number of questions for each block and task in the Interprovincial exam |
| Appendix E —
Pie Chart | a graph which depicts the national percentages of exam questions assigned to blocks |
| Appendix F —
Task Profile
Chart | a chart which outlines graphically the blocks, tasks and sub-tasks of this analysis |

DEVELOPMENT AND VALIDATION OF ANALYSIS

Development of Analysis

A draft analysis is developed by a committee of industry experts in the field led by a team of facilitators from ESDC. This draft analysis breaks down all the tasks performed in the occupation and describes the knowledge and abilities required for a tradesperson to demonstrate competence in the trade.

Draft Review

The NOA development team then forwards a copy of the analysis and its translation to provincial and territorial authorities for a review of its content and structure. Their recommendations are assessed and incorporated into the analysis.

Validation and Weighting

The analysis is sent to all provinces and territories for validation and weighting. Participating jurisdictions consult with industry to validate and weight the document, examining the blocks, tasks and sub-tasks of the analysis as follows:

BLOCKS	Each jurisdiction assigns a percentage of questions to each block for an examination that would cover the entire trade.
TASKS	Each jurisdiction assigns a percentage of exam questions to each task within a block.
SUB-TASKS	Each jurisdiction indicates, with a YES or NO, whether or not each sub-task is performed by skilled workers within the occupation in its jurisdiction.

The results of this exercise are submitted to the NOA development team who then analyzes the data and incorporates it into the document. The NOA provides the individual jurisdictional validation results as well as the national averages of all responses. The national averages for block and task weighting guide the Interprovincial Red Seal Examination plan for the trade.

This method for the validation of the NOA also identifies common core sub-tasks across Canada for the occupation. If at least 70% of the responding jurisdictions perform a sub-task, it shall be considered common core. Interprovincial Red Seal Examinations are based on the common core sub-tasks identified through this validation process.

Definitions for Validation and Weighting

YES	sub-task performed by qualified workers in the occupation in a specific jurisdiction
NO	sub-task not performed by qualified workers in the occupation in a specific jurisdiction
NV	analysis <u>N</u> ot <u>V</u> alidated by a province/territory
ND	trade <u>N</u> ot <u>D</u> esignated in a province/territory
NOT COMMON CORE (NCC)	sub-task, task or block performed by less than 70% of responding jurisdictions; these will not be tested by the Interprovincial Red Seal Examination for the trade
NATIONAL AVERAGES %	average percentage of questions assigned to each block and task in Interprovincial Red Seal Examination for the trade

Provincial/Territorial Abbreviations

NL	Newfoundland and Labrador
NS	Nova Scotia
PE	Prince Edward Island
NB	New Brunswick
QC	Quebec
ON	Ontario
MB	Manitoba
SK	Saskatchewan
AB	Alberta
BC	British Columbia
NT	Northwest Territories
YT	Yukon Territory
NU	Nunavut

ANALYSIS

Safe working procedures and conditions, accident prevention, and the preservation of health are of primary importance to industry in Canada. These responsibilities are shared and require the joint efforts of government, employers and employees. It is imperative that all parties become aware of circumstances that may lead to injury or harm. Safe learning experiences and work environments can be created by controlling the variables and behaviours that may contribute to accidents or injury.

It is generally recognized that safety-conscious attitudes and work practices contribute to a healthy, safe and accident-free work environment.

It is imperative to apply and be familiar with the Occupational Health and Safety (OH&S) Acts and Workplace Hazardous Materials Information System (WHMIS) Regulations. As well, it is essential to determine workplace hazards and take measures to protect oneself, co-workers, the public and the environment.

Safety education is an integral part of training in all jurisdictions. As safety is an imperative part of all trades, it is assumed and therefore it is not included as a qualifier of any activities. However, the technical safety tasks and sub-tasks specific to the trade are included in this analysis.

SCOPE OF THE IRONWORKER (GENERALIST) TRADE

“Ironworker (Generalist)” is this trade’s official Red Seal occupational title approved by the CCDA. This analysis covers tasks performed by ironworkers (generalists) whose occupational title has been identified by some provinces and territories of Canada under the following names:

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU
Ironworker							✓		✓				
Ironworker (Generalist)	✓	✓	✓	✓						✓			
Ironworker Generalist						✓							

Ironworkers (generalists) work with both structural/ornamental and reinforcing steel materials. They install structural/ornamental steel components, precast concrete members and place reinforcing steel in commercial, industrial, institutional and large residential buildings, towers, bridges and stadiums. In some jurisdictions they may also install glued laminated timber products (glulam). They erect pre-engineered buildings and ornamental ironwork such as curtain walls, metal stairways, catwalks, railings and metal doors.

Ironworkers (generalists) cut, bend, lay out and place reinforcing steel rods, welded wire fabric and composite materials in a wide variety of poured concrete products and structures such as buildings, highways, bridges, stadiums and towers. While reinforcing material is usually pre-cut and fabricated off-site, ironworkers (generalists) may be called upon to cut and bend them according to design specifications and drawings. They may pre-assemble reinforcing material by laying it out and connecting sub-assemblies on the ground prior to final placement. They position, align and secure components according to drawings, using a variety of methods. They also place and stress various post-tensioning systems in structures such as parking garages, bridges and stadiums where longer unsupported spans are required. After placing post-tensioning systems, they stress the tendons to predetermined specifications using hydraulic jacks and pumps.

Ironworkers (generalists) prepare the site by assembling the hoisting equipment and erecting scaffolding, cranes, hoists and derricks on the construction site. They unload structural, ornamental, reinforcing materials and organize the material for installation. They connect cables and slings to the components and direct crane operators in lifts. They position, align and secure components according to blueprints using a variety of fastening methods. They also install conveyors, machinery and automated material handling systems. They are also involved in demolition and salvage duties involving all types of construction.

Ironworkers (generalists) generally work outside in all weather, although some work indoors in manufacturing plants or underground work sites. Work sites may be in a variety of locations ranging from remote areas where they could be working on dams, bridges or mining projects to urban environments where they could work on high-rise buildings, parking garages, transit systems, tunnels or stadiums.

The work often requires considerable standing, bending, crawling, lifting, climbing, pulling and reaching, and is often conducted in cramped, confined spaces or at heights. Hazards include injury from electrocution, falls or falling objects. Inclement weather may shut down projects for extended periods and deadlines and priorities may involve overtime.

Ironworkers (generalists) are required to have good mechanical aptitude, the ability to visualize finished products in three dimensions, the ability to maintain balance working at heights in varying extreme climates. A thorough knowledge of the principles of lifting and hoisting is required as is a familiarity with a variety of metal fastening and joining methods. They are also required to be competent in the use and care of a variety of hand and power tools and equipment such as tying tools, pry bars, jacks, torches, cut-off saws, hydraulic benders, shears, welding equipment, stressing equipment and cranes. They also use crane charts and must be able to estimate and reconcile crane ability with load sizes.

Because of the nature of the work ironworkers (generalists) must be thoroughly familiar with the applicable sections of local, provincial and federal building and safety standards.

Ironworkers (generalists) tend to work in teams and with other tradespeople, and team coordination is a large component of the occupation especially when hoisting and placing large, heavy components high above the ground.

OCCUPATIONAL OBSERVATIONS

Technology continues to contribute to many changes in equipment design and construction materials. These innovations require constantly changing methods and techniques governed by appropriate attitudes towards the current high standards for fabrication, erection and installation of structural and ornamental components. Maintaining updated knowledge of these changes presents a daily challenge to the people of this trade.

The work of an ironworker (generalist), by its nature, possesses inherent hazards. Safe work procedures, best practices and job hazard analysis assist in controlling or eliminating hazards. However, errors in judgment or in practical application of trade knowledge can be costly, both in terms of injury to workers and damage to equipment or materials. Workers must maintain constant attention to the application of safety and accident prevention at all times.

Equipment such as fall protection equipment, aerial work platforms, breathing apparatus and fume extraction equipment have become an integral part of all worksites and places of employment.

Ironworkers (generalists) are increasingly being called on to document and maintain records due to more stringent laws and regulations. The end products in industrial and other applications must be appropriately installed, inspected and documented. This places more responsibility on supervisors, quality control personnel and the individuals who perform the installation and assembly of components. The tremendous variety in equipment and methods means that the ironworker (generalist) must be more knowledgeable and adaptable than ever before.

ROLES AND OPPORTUNITIES FOR SKILLED TRADES IN A SUSTAINABLE FUTURE

Climate change affects all of us. Trades play a large role in implementing solutions and adjusting to changes in the world.

Throughout this standard, there may be specific references to tasks, skills and knowledge that clearly show this trade's role in a more sustainable future. Each trade has different roles to play and contributions to make in their own way.

For example:

- Construction tradespeople need to consider the materials they are using, building methods, and improvements to mechanical and electrical installations. There are important changes to codes and standards to help meet the climate change goals and commitments set for 2030 and 2050. Retrofits and new construction of low-energy buildings provide enormous opportunities for workers in this sector. Concepts, such as energy efficiency and regarding buildings as systems are foundational.
- Automotive and mechanical trades are seeing a shift towards the electrification of vehicles and equipment. As a result, new skills and knowledge will be required for tradespeople working in this sector. There are mandates for sales of new light-duty zero-emission vehicles (ZEV) in Canada, with the goal of achieving 100% ZEV sales by 2035. Due to this mandate, the demand for these vehicles is growing quickly among consumers and fleets. With this escalating demand, the need for skilled workers to maintain and repair these vehicles is also increasing.
- In industrial and resource sectors, there is pressure to move towards increased electrification of industrial processes. Many industrial and commercial facilities are also being upgraded to improve energy efficiency in areas such as lighting systems, and new production processes and technologies. There are also opportunities in carbon capture, utilization and storage (CCUS), as well as the production and export of low-carbon hydrogen.
- Trades in the service sector may also need to be aware of responsible sourcing, as well as efficient use of products and materials. New ways of working better are always a part of the job.

There are fast-moving changes in guidelines, codes, regulations and specifications. Many are being implemented for the purpose of energy efficiency and climate change. Those that affect specific trades may be mentioned within the standard. Examples of these guidelines and legislation include:

- The National Energy Code of Canada for Buildings (NECB).
- The Canadian Net-Zero Emissions Accountability Act (CNZEAA).
- programs that encourage sustainable building design and construction such as Leadership in Energy and Environmental Design (LEED) and the Zero Carbon Building (ZCB) standards.
- the Montreal Protocol for phasing out R22 refrigerants.

- energy efficiency programs such as ENERGY STAR.
- principles of the United Nations Declaration for the Rights of Indigenous Peoples pertaining to energy sector development.

Apprentices and tradespeople need to increase their climate literacy and reinforce their own understanding of energy issues and environmental practices. It is important for them to understand why these changes are happening and their effect on trades' work. While individual tradespeople and apprentices may not be able to choose certain elements like; the architectural design of buildings, building material selection, regulatory requirements, use of electric vehicles and technologies, they must understand the impact of using these elements in their work. Impacts include using environmentally friendly products and following requirements related to the disposal and recycling of materials.

In apprenticeship, as well as in ongoing professional development, employers and instructors should encourage learning about these concepts, why they are important, how they are implemented, and the overarching targets they are aiming to achieve.

All in all, it's about doing the work better and building a better world.

Trends

There is greater emphasis on training and retraining of ironworkers (generalists). There is also a greater awareness of safety and safer working conditions and an increased emphasis on job coordination and scheduling. Also, there have been significant changes in the engineering and technology of ironworker (generalist) tools and equipment such as laser levels and electronic measuring instruments. Aerial work platforms and specialty access equipment technology is constantly improving and are widely used.

Task 1**Interprets occupational documentation.****Related Components (including, but not limited to)**

Drawings (structural, architectural, mechanical, engineering, detail and layout), codes (American National Standards Institute [ANSI], Canadian Standards Association [CSA], Concrete Reinforcing Steel Institute [CRSI], Reinforcing Steel Institute of Canada [RSIC], Post Tensioning Institute [PTI], American Society of Testing and Materials [ASTM] and WHMIS), specifications, shipping documentation, manufacturers' manuals and OH&S legislation.

Tools and Equipment

Architectural scales, calculator, measuring tape.

Sub-task**A-1.01 Interprets drawings and specifications.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	yes	yes	ND	NV	yes	NV	yes	yes	ND	ND	ND

Supporting Knowledge and Abilities

A-1.01.01	knowledge of types of drawings such as structural erection, reinforcing, architectural, pre-cast shop and fabrication
A-1.01.02	knowledge of welding symbols
A-1.01.03	knowledge of abbreviations and technical vocabulary
A-1.01.04	knowledge of drafting techniques
A-1.01.05	ability to interpret drawing symbols

A-1.01.06	ability to correlate types of drawings such as structural drawings, architectural drawings, engineering drawings, detail drawings and erection drawings
A-1.01.07	ability to distinguish types of views
A-1.01.08	ability to relate drawings to worksite

Sub-task

A-1.02 Interprets standards, regulations and procedures.

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	yes	yes	ND	NV	yes	NV	yes	yes	ND	ND	ND

Supporting Knowledge and Abilities

A-1.02.01	knowledge of standards such as CSA, ANSI, CRSI, RSIC, PTI and ASTM
A-1.02.02	knowledge of regulations such as OH&S Act, WHMIS, fall protection, mobile equipment and confined space
A-1.02.03	knowledge of the location of standards, regulations and procedures
A-1.02.04	ability to apply procedures such as welding, assembly, placing, tensioning and grouting
A-1.02.05	ability to apply written work procedures.

Task 2**Communicates in the workplace.**

Related Components (including, but not limited to) Manufacturers' documentation, manuals, record books.

Tools and Equipment Communication devices (fax, cellular phone, telephone, photocopier, computer, cameras, headsets, two-way radios, printers), flags, signage.

Sub-task**A-2.01 Communicates with co-workers.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

A-2.01.01 knowledge of types of communication
A-2.01.02 knowledge of interpersonal communication techniques
A-2.01.03 knowledge of trade vocabulary
A-2.01.04 knowledge of barriers to communication
A-2.01.05 ability to write clearly and concisely
A-2.01.06 ability to actively listen
A-2.01.07 ability to check to confirm understanding

Sub-task**A-2.02 Communicates with others.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

A-2.02.01 knowledge of job-related terminology
A-2.02.02 knowledge of report formats
A-2.02.03 ability to actively listen

A-2.02.04	ability to translate technical terms into layperson language
A-2.02.05	ability to address others' concerns
A-2.02.06	ability to write reports in prescribed formats
A-2.02.07	ability to check to confirm understanding

Sub-task

A-2.03 Communicates with apprentices.

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

A-2.03.01	knowledge of capability of apprentice
A-2.03.02	ability to listen, teach, coach and mentor
A-2.03.03	ability to supervise
A-2.03.04	ability to assess and record ongoing progress

Sub-task

A-2.04 Uses hand signals.

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

A-2.04.01	knowledge of types of signals such as crane signals
A-2.04.02	knowledge of hand signals
A-2.04.03	knowledge of signal terminology
A-2.04.04	ability to select types of signals
A-2.04.05	ability to interpret signals
A-2.04.06	ability to select signals for type of equipment

Sub-task**A-2.05 Communicates electronically.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

A-2.05.01	knowledge of types of electronic communication devices such as cellular phones, two-way radios and lap-top computers
A-2.05.02	knowledge of communication protocols and company reporting policies
A-2.05.03	ability to operate electronic communication devices
A-2.05.04	ability to send, receive and retrieve information from computers
A-2.05.05	ability to communicate through two-way radios and cellular phones

Task 3**Uses and maintains tools and equipment.**

Related Components (including, but not limited to) Manufacturers' manuals, cleaning supplies, lubricating supplies.

Tools and Equipment See Appendix A.

Sub-task**A-3.01 Uses hand tools and measuring equipment.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

A-3.01.01	knowledge of types and uses of hand tools
A-3.01.02	knowledge of hand tool safety
A-3.01.03	knowledge of manufacturers' specifications on the use and care of hand tools
A-3.01.04	knowledge of types of measuring equipment

A-3.01.05	ability to select hand tools required for a task
A-3.01.06	ability to identify damaged, worn or otherwise unsafe hand tools
A-3.01.07	ability to clean and store hand tools
A-3.01.08	ability to maintain hand tools

Sub-task

A-3.02 Uses power tools.

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

A-3.02.01	knowledge of types and uses of power tools such as pneumatic, electric, gas powered and hydraulic
A-3.02.02	knowledge of power tool components
A-3.02.03	knowledge of operating procedures for power tools
A-3.02.04	knowledge of power tool safety
A-3.02.05	knowledge of manufacturers' recommended uses, limitations and maintenance of power tools
A-3.02.06	ability to select power tools required for a task
A-3.02.07	ability to identify damaged, worn or otherwise unsafe power tools
A-3.02.08	ability to clean and store power tools
A-3.02.09	ability to maintain power tools

Sub-task

A-3.03 Uses bending tools and equipment.

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

A-3.03.01	knowledge of types and uses of bending equipment
A-3.03.02	knowledge of manufacturers' recommended uses and limitations
A-3.03.03	knowledge of potential hazards and safety issues
A-3.03.04	ability to select bending equipment

A-3.03.05	ability to set up and check calibration of bending equipment
A-3.03.06	ability to identify damaged, worn or otherwise unsafe bending equipment

Sub-task

A-3.04 Uses powder-actuated tools.

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

A-3.04.01	knowledge of types and uses of powder-actuated tools
A-3.04.02	knowledge of powder-actuated tool components
A-3.04.03	knowledge of operating procedures for powder-actuated tools
A-3.04.04	knowledge of powder-actuated tool safety
A-3.04.05	knowledge of manufacturers' recommended uses and limitations
A-3.04.06	knowledge of powder-actuated tools regulations and certification requirements
A-3.04.07	ability to select powder-actuated charges and fasteners required for a task
A-3.04.08	ability to identify damaged, worn or otherwise unsafe powder-actuated tools
A-3.04.09	ability to clean and lubricate powder-actuated tools
A-3.04.10	ability to store powder-actuated tools

Sub-task

A-3.05 Uses aerial work platforms.

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

A-3.05.01	knowledge of types and uses of aerial work platforms
A-3.05.02	knowledge of aerial work platform safety
A-3.05.03	knowledge of aerial work platform regulations and certification requirements
A-3.05.04	knowledge of aerial work platform components and accessories
A-3.05.05	knowledge of operating procedures of aerial work platforms
A-3.05.06	knowledge of manufacturers' specifications for use of aerial work platforms

A-3.05.07	ability to identify damaged, worn or otherwise unsafe aerial work platforms and equipment
A-3.05.08	ability to position aerial work platforms
A-3.05.09	ability to store aerial work platforms

Sub-task

A-3.06 Uses ladders.

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

A-3.06.01	knowledge of types and uses of ladders
A-3.06.02	knowledge of safe operating procedures for ladders
A-3.06.03	knowledge of manufacturers' specifications for use and care of ladders
A-3.06.04	ability to position ladders
A-3.06.05	ability to secure ladders
A-3.06.06	ability to dismantle and store ladders
A-3.06.07	ability to identify damaged, worn or otherwise unsafe ladders

Sub-task

A-3.07 Uses scaffolding.

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

A-3.07.01	knowledge of regulations pertaining to scaffolding
A-3.07.02	knowledge of types of scaffolding and components
A-3.07.03	knowledge of installation and dismantling procedures
A-3.07.04	knowledge of manufacturers' recommended uses and limitations of scaffolding
A-3.07.05	ability to position and erect scaffolding and install planking, guardrails and toe plates

A-3.07.06	ability to secure scaffolding, planking, guardrails, toe plates and related components
A-3.07.07	ability to dismantle and store scaffolding
A-3.07.08	ability to identify damaged, worn or otherwise unsafe scaffolding and planking

Sub-task

A-3.08 Uses personal protective equipment (PPE).

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

A-3.08.01	knowledge of types and uses of PPE such as hard hats, safety glasses, hearing protection, welding PPE, safety footwear and fall protection equipment
A-3.08.02	knowledge of PPE safety
A-3.08.03	knowledge of manufacturers' recommended uses, limitations and maintenance of PPE
A-3.08.04	knowledge of workplace rules and regulations
A-3.08.05	ability to select PPE for conditions encountered
A-3.08.06	ability to use fall protection equipment such as harnesses, safety belts and lines
A-3.08.07	ability to identify damaged, worn or otherwise unsafe PPE
A-3.08.08	ability to store PPE

Sub-task

A-3.09 Uses surveying equipment.

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

A-3.09.01	knowledge of types of layout instruments such as theodolite, transit, scales, laser level, total station and builder's level
A-3.09.02	knowledge of measurement techniques
A-3.09.03	knowledge of blueprint interpretation

A-3.09.04	knowledge of marking techniques
A-3.09.05	ability to select equipment for a task
A-3.09.06	ability to calculate angles and distances
A-3.09.07	ability to transfer blueprint information to site
A-3.09.08	ability to set up and check calibration of equipment
A-3.09.09	ability to store surveying equipment

Sub-task

A-3.10 Uses welding equipment.

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

A-3.10.01	knowledge of provincial/territorial and applicable welding regulations
A-3.10.02	knowledge of Canadian Welding Bureau (CWB) standards
A-3.10.03	knowledge of welding processes and procedures
A-3.10.04	knowledge of welding symbols
A-3.10.05	knowledge of welding hazards
A-3.10.06	knowledge of welding equipment
A-3.10.07	knowledge of welding consumables
A-3.10.08	knowledge of welding defects
A-3.10.09	ability to set up welding equipment
A-3.10.10	ability to perform welding processes
A-3.10.11	ability to adjust welding parameters to suit site conditions
A-3.10.12	ability to identify damaged, worn or otherwise unsafe welding equipment
A-3.10.13	ability to store welding equipment

Sub-task**A-3.11 Uses thermal and oxy-fuel cutting equipment.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

A-3.11.01	knowledge of cutting processes
A-3.11.02	knowledge of cutting equipment
A-3.11.03	knowledge of cutting consumables
A-3.11.04	ability to set up equipment
A-3.11.05	ability to inspect equipment
A-3.11.06	ability to adjust cutting parameters
A-3.11.07	ability to recognize cutting hazards
A-3.11.08	ability to identify damaged, worn or otherwise unsafe cutting equipment
A-3.11.09	ability to store cutting equipment and consumables

Task 4**Organizes work.**

**Related
Components
(including, but not
limited to)**

Company standards, safety manuals, company policies, procedures and regulations, schedules/calendars, drawings, specifications.

**Tools and
Equipment**

See Appendix A.

Sub-task**A-4.01 Organizes materials and supplies.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

A-4.01.01	knowledge of erection sequence
A-4.01.02	knowledge of placing and assembly
A-4.01.03	knowledge of equipment capabilities and limitations
A-4.01.04	knowledge of site preparation
A-4.01.05	knowledge of shipping documentation
A-4.01.06	knowledge of product specific storage and handling principles
A-4.01.07	knowledge of types of materials and their identification requirements
A-4.01.08	ability to schedule material and supplies required for job
A-4.01.09	ability to unload equipment
A-4.01.10	ability to place and sort materials and supplies
A-4.01.11	ability to reconcile load with shipping documents
A-4.01.12	ability to secure equipment and materials

Sub-task**A-4.02 Marks layouts.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

A-4.02.01	knowledge of drawings
A-4.02.02	ability to interpret drawings
A-4.02.03	ability to use measuring devices and layout tools
A-4.02.04	ability to apply marking and layout techniques
A-4.02.05	ability to visualize finished product
A-4.02.06	ability to transfer drawing information to accommodate site conditions

Sub-task**A-4.03 Maintains safe work environment.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

A-4.03.01	knowledge of safety regulations
A-4.03.02	knowledge of building codes
A-4.03.03	knowledge of applications of safety equipment
A-4.03.04	knowledge of safe work practices and limitations
A-4.03.05	ability to apply safety standards applicable to workplace
A-4.03.06	ability to install safety equipment such as guardrails, static lines, lifelines, screens, temporary flooring, warning signs and barriers
A-4.03.07	ability to maintain good housekeeping

Sub-task**A-4.04 Assesses site hazards.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

A-4.04.01	knowledge of policies and procedures
A-4.04.02	knowledge of codes and regulations
A-4.04.03	ability to recognize hazards such as floor openings, leading edges, and obstructions, temporary supports, dowels and chemical/corrosive/UV environments
A-4.04.04	ability to control hazards
A-4.04.05	ability to perform and document a job hazard analysis (JHA) or a task hazard analysis (THA)

Sub-task**A-4.05 Plans work tasks.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

A-4.05.01	knowledge of procedures, specifications and drawings
A-4.05.02	ability to interpret specifications and drawings
A-4.05.03	ability to improvise to suit site conditions
A-4.05.04	ability to maintain schedule
A-4.05.05	ability to select materials and supplies required for task
A-4.05.06	ability to select equipment and tools required for task

Trends

The occupation has seen an increase in the development and deployment of new technologies such as specialty rigging and the use of synthetic materials. The occupation has seen the increased presence of comprehensive regulations, especially in regard to the use of heavy mobile equipment.

Task 5**Selects rigging equipment.**

**Related
Components
(including, but not
limited to)**

Charts, working load limits, safety factors, rigging capacities.

**Tools and
Equipment**

See Appendix A

Sub-task**B-5.01 Matches load to lift capability.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

- B-5.01.01 knowledge of types of lifting equipment such as hydraulic jacks, fork lifts, air pallets, pallet jacks and rollers
- B-5.01.02 knowledge of the capacity of lifting equipment
- B-5.01.03 knowledge of basic geometry
- B-5.01.04 knowledge of weights and measures
- B-5.01.05 ability to calculate weights of loads
- B-5.01.06 ability to select rigging equipment
- B-5.01.07 ability to calculate choker tension based on choker angle and load

Sub-task**B-5.02 Inspects rigging equipment.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

B-5.02.01	knowledge of types of rigging equipment
B-5.02.02	knowledge of manufacturers' specifications
B-5.02.03	knowledge of policies and procedures
B-5.02.04	knowledge of tools and materials
B-5.02.05	ability to identify defects and damage
B-5.02.06	ability to report defects and damage

Sub-task**B-5.03 Maintains rigging equipment.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

B-5.03.01	knowledge of types of rigging equipment
B-5.03.02	knowledge of manufacturers' specifications
B-5.03.03	knowledge of policies and procedures
B-5.03.04	knowledge of tools and materials
B-5.03.05	ability to perform maintenance procedures
B-5.03.06	ability to store rigging equipment

Task 6**Uses hoisting and lifting equipment.****Related Components (including, but not limited to)**

Load charts, lift diagrams, working load limits, safety factors, fabricated members and construction materials.

Tools and Equipment (including, but not limited to)

Hooks, clips, headache ball, wire rope, Tirfor® (cable puller), come-along, fibre rope, blocks, tugger, tag lines, wedge socket (becket), hydraulic jacks, chain fall, telehandler, derricks, mobile equipment, cranes.

Also see Appendix A.

Sub-task**B-6.01 Uses hoisting equipment.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

- B-6.01.01 knowledge of provincial/territorial and applicable regulations and certification requirements
- B-6.01.02 knowledge of types of hoisting equipment such as come-alongs, grip hoist, chain block hoists, tuggers and derricks
- B-6.01.03 knowledge of anchorage locations and capabilities
- B-6.01.04 knowledge of policies and procedures
- B-6.01.05 ability to select hoisting equipment
- B-6.01.06 ability to select anchorage locations
- B-6.01.07 ability to follow manufacturers' specifications

Sub-task**B-6.02 Uses lifting equipment.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

B-6.02.01 knowledge of types of lifting equipment such as hydraulic jacks, fork lifts and air pallets

B-6.02.02 knowledge of policies and procedures

B-6.02.03 ability to select lifting equipment

B-6.02.04 ability to follow manufacturers' specifications and recommendations

Sub-task**B-6.03 Attaches rigging to load.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

B-6.03.01 knowledge of hoisting procedures such as engineer's plan, multi-member and tandem lift

B-6.03.02 knowledge of placement and attachment location

B-6.03.03 knowledge of hoisting specifications

B-6.03.04 ability to follow lifting procedures

B-6.03.05 ability to use and tie knots, bends and hitches

B-6.03.06 ability to follow rigging procedures

B-6.03.07 ability to use rigging equipment

Trends Modern cranes have greater lifting capacity and are more precise in the positioning of their loads, often within millimetres of specifications. The erection of cranes has also become more automatic, with modern cranes greatly assisting in their own assembly.

Task 7**Selects, assembles and erects cranes and components.**

Related Components (including, but not limited to) Mats, pads, dunnage, boom sections and jib, counterweight, pins and cotter pins, bolts, blocks and sheaves, headache ball, clips, hook, anti-two block, wedge socket, mast, outriggers, gantry, cable components (pendant lines, jib lines, guide lines, load lines).

Tools and Equipment (including, but not limited to) Sledge hammer, back-out hammer (B & O hammer), wrenches, pry bars, rigging hardware, pliers, types of cranes (assist cranes, rough terrain cranes, all terrain, crawler, hydraulic, tower, boom, electric overhead travelling [EOT], heavy lift, gantries, knuckle boom), specialty heavy lift components.
Also see Appendix A.

Sub-task**C-7.01 Assesses crane site limitations.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

C-7.01.01	knowledge of types of hazards such as overhead power lines, underground services, ground conditions, other workers and obstructions to swing radius
C-7.01.02	knowledge of swing area (radius) of crane
C-7.01.03	knowledge of crane limitations due to inclement weather
C-7.01.04	ability to calculate crane radius
C-7.01.05	ability to identify potential hazards
C-7.01.06	ability to read load charts
C-7.01.07	ability to minimize overhead dangers

Sub-task**C-7.02 Determines crane position.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

C-7.02.01	knowledge of crane types
C-7.02.02	knowledge of crane capacity
C-7.02.03	knowledge of crane radius
C-7.02.04	knowledge of maximum weight of lifts
C-7.02.05	knowledge of crane limitations due to inclement weather
C-7.02.06	ability to determine weights of components
C-7.02.07	ability to calculate the available headroom
C-7.02.08	ability to select crane for required task

Sub-task**C-7.03 Prepares bases.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

C-7.03.01	knowledge of gross weight of crane
C-7.03.02	knowledge of composition of base such as soil, concrete and steel
C-7.03.03	knowledge of types of pads
C-7.03.04	ability to select pads such as mats, dunnage and cribbing
C-7.03.05	ability to visually assess ground conditions
C-7.03.06	ability to ensure ground is stable and level
C-7.03.07	ability to install falsework

Sub-task**C-7.04 Erects crane and components.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

C-7.04.01	knowledge of sequence of assembly
C-7.04.02	knowledge of crane components such as boom sections, counterweights and jibs
C-7.04.03	knowledge of crane signals
C-7.04.04	knowledge of tools used in assembly and erection of cranes
C-7.04.05	knowledge of safe rigging practices
C-7.04.06	ability to ensure adequate space for assembly
C-7.04.07	ability to install components
C-7.04.08	ability to reeve/lace blocks
C-7.04.09	ability to participate in engineered (critical) lifts

Task 8**Disassembles cranes.****Related Components (including, but not limited to)**

Mats, pads, dunnage, boom sections and jib, counterweight, pins and cotter pins, bolts, blocks and sheaves, headache ball, clips, hook, anti-two block, wedge socket, mast, outriggers, gantry, cable components (pendant lines, jib lines, guide lines, load lines).

Tools and Equipment

Sledge hammer, back-out hammer (B & O hammer), wrenches, pry bars, rigging hardware, pliers, types of cranes (assist cranes, rough terrain cranes, all terrain, crawler, hydraulic, tower, boom, EOT, heavy lift, gantries, knuckle boom), specialty heavy lift components.
Also see Appendix A.

Sub-task**C-8.01 Disassembles crane components.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

C-8.01.01	knowledge of method of disassembly
C-8.01.02	knowledge of sequence of disassembly
C-8.01.03	knowledge of equipment and tools required for task
C-8.01.04	knowledge of rigging
C-8.01.05	ability to recognize hazards of disassembly such as tensioned pins and overloads
C-8.01.06	ability to disconnect components
C-8.01.07	ability to rig crane components
C-8.01.08	ability to block boom sections

Sub-task**C-8.02 Prepares crane and components for transport.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

- C-8.02.01 knowledge of safe rigging practices
- C-8.02.02 knowledge of jurisdictional transportation regulations
- C-8.02.03 ability to select type of rigging
- C-8.02.04 ability to place and secure components on transportation deck

Trends The occupation has seen the increased development and use of composite materials such as stainless steel. New technologies are being developed and introduced to the occupation allowing for greater automation such as automated benders and tiers. More intricate and elaborate, non-linear building design has led to an increase in creative and innovative reinforcing techniques. The occupation has also seen an increase in the demand for compliance to new seismic codes.

Task 9**Fabricates on-site.**

Related Components (including, but not limited to) Rebar, welded wire mesh fabric, composite materials, tie wire, bar supports (bolsters, chairs and concrete blocks), dunnage, and coupling devices.

Tools and Equipment See Appendix A.

Sub-task**D-9.01 Cuts material.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

D-9.01.01	knowledge of reinforcing material such as rebar, welded wire mesh fabric and composite material
D-9.01.02	knowledge of material specifications
D-9.01.03	knowledge of cutting techniques
D-9.01.04	ability to measure and mark material for cutting
D-9.01.05	ability to use cutting equipment

Sub-task**D-9.02 Bends material.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

D-9.02.01 knowledge of reinforcing material such as rebar and welded wire mesh fabric

D-9.02.02 knowledge of material specifications

D-9.02.03 knowledge of bending techniques

D-9.02.04 ability to measure and mark material for bending

D-9.02.05 ability to maintain bend standards

Task 10**Installs reinforcing material.****Related Components (including, but not limited to)**

Rebar, welded wire mesh fabric, composite materials, tie wire, bar supports (bolsters, chairs and concrete blocks), dunnage, couplers, coupling devices.

Tools and Equipment

Hand tools (sledge hammer, pliers, cutters, measuring tape, chalk, shears, bolt cutters, hickey), quick-cut saws, power wrench, pneumatic gun, portable grinder, rebar bender, power bender, hammer drill, rigging equipment, cutting torch, come-alongs, wire reel, work positioning hook, fall arrest equipment.
Also see Appendix A.

Sub-task**D-10.01 Places reinforcing material.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	yes	yes	ND	NV	yes	NV	yes	yes	ND	ND	ND

Supporting Knowledge and Abilities

D-10.01.01	knowledge of reinforcing material such as rebar, welded wire mesh fabric and composite materials
D-10.01.02	knowledge of installation sequencing such as laying out and placing ties and supports
D-10.01.03	knowledge of pre-assembly and pre-fabrication procedures
D-10.01.04	ability to apply manual and mechanical lifting and carrying techniques
D-10.01.05	ability to place material within tolerances
D-10.01.06	ability to apply covers as per specifications

Sub-task**D-10.02 Ties material.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

D-10.02.01	knowledge of types of wire ties such as figure-8, snap tie and saddle tie
D-10.02.02	knowledge of tying specifications
D-10.02.03	knowledge of tying tools and equipment
D-10.02.04	knowledge of tying sequence
D-10.02.05	ability to select wire type and gauge depending on application
D-10.02.06	ability to tie variety of ties such as figure-8, snap tie and double wire tie according to application

Sub-task**D-10.03 Joins material.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

D-10.03.01	knowledge of CSA and applicable welding regulations
D-10.03.02	knowledge of welding techniques
D-10.03.03	knowledge of splicing techniques
D-10.03.04	knowledge of mechanical splicing and coupling techniques
D-10.03.05	knowledge of specialty anchoring systems and their installation
D-10.03.06	ability to select joining tools and equipment
D-10.03.07	ability to operate joining tools and equipment

Trends

The occupation has seen an increase in the use of composite materials resulting in changes to the pre-stressed and post-stressed tensioning systems. An increased awareness of environmental concerns has resulted in the development of new handling techniques and procedures. Due to the aging of major structures nationwide, the occupation continues to see an increase in repair and restoration. Advancements in technology have allowed for the construction of longer spans and larger open spaces.

Task 11**Places pre-stressed/post-tensioning systems.****Related Components (including, but not limited to)**

Bulkheads, coils, anchors (barrel, cable), pocket former, cable tendons, bar tendons, dead heads, trumpets, trumplates, wedges, wedge plates, blocks, duct, duct tape, bursting steel components, couplers, bearing plate, grout.

Tools and Equipment

See Appendix A.

Sub-task**E-11.01 Lays out profile.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	yes	yes	ND	NV	yes	NV	yes	yes	ND	ND	ND

Supporting Knowledge and Abilities

E-11.01.01	knowledge of types of pre-stressed/post-tensioning systems such as bonded, and un-bonded, mono-strand and multi-strand
E-11.01.02	knowledge of pre-stressed/post-tensioning materials
E-11.01.03	knowledge of pre-stressed/post-tensioning installation practices
E-11.01.04	knowledge of placement tolerances of ductwork, tendons and supports
E-11.01.05	knowledge of benchmarks and elevations
E-11.01.06	ability to lay out duct, anchorage and tendon position

Sub-task**E-11.02 Places tendons and accessories.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

E-11.02.01	knowledge of types of pre-stressed/post-tensioning systems such as bonded, and un-bonded, mono-strand and multi-strand
E-11.02.02	knowledge of pre-stressed/post-tensioning materials such as strand, bar and anchors
E-11.02.03	knowledge of pre-stressed/post-tensioning installation practices
E-11.02.04	knowledge of pre-stressed/post-tensioning installation sequences
E-11.02.05	knowledge of tolerances
E-11.02.06	ability to position tendons and accessories
E-11.02.07	ability to secure tendons and accessories
E-11.02.08	ability to recognize and repair damage to ducts and tendons
E-11.02.09	ability to operate winching equipment

Sub-task**E-11.03 Installs bursting steel and anchorages.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

E-11.03.01	knowledge of types of bursting steel
E-11.03.02	knowledge of types of anchorages
E-11.03.03	knowledge of types of components such as blocks, wedges, anchors and coils
E-11.03.04	knowledge of bursting steel and anchorage installation procedures and placing tolerances
E-11.03.05	ability to place, modify and tie bursting steel
E-11.03.06	ability to install anchorages

Sub-task**E-11.04 Connects tendons to anchors.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

E-11.04.01	knowledge of types of anchors such as barrel (trumpet) and cable
E-11.04.02	knowledge of types of tendons
E-11.04.03	knowledge of tendon and anchor connection procedures
E-11.04.04	knowledge of fastening techniques
E-11.04.05	ability to install anchors
E-11.04.06	ability to secure wedges

Sub-task**E-11.05 Protects exposed tendons.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

E-11.05.01	knowledge of tendon protection materials such as duct tape, heat shrink and grease/caulking
E-11.05.02	knowledge of protection techniques
E-11.05.03	knowledge of potential contaminants
E-11.05.04	ability to select tendon protection material
E-11.05.05	ability to identify and correct faults
E-11.05.06	ability to install tendon protection material

Task 12

Stresses tendons.

Related Components (including, but not limited to)

Stressing plates, caps, tendons, ducts, anchorage, blocks, wedges, lock nuts, bars.

Tools and Equipment

Hydraulic jacks and pumps, hoses, power cords, hoisting equipment, rigging equipment, stressing equipment, marking equipment, de-coiler, carousel, measuring equipment, chucks, wrenches, sockets, setting tools, couplers, hammers, fork lifts, scaffolding, come-alongs, chain falls, grip hoists, dunnage, gauges, grinder, cut-off saw, safety barriers.
Also see Appendix A.

Sub-task

E-12.01 Sets up stressing equipment.

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	yes	yes	ND	NV	yes	NV	yes	yes	ND	ND	ND

Supporting Knowledge and Abilities

E-12.01.01	knowledge of types of stressing equipment
E-12.01.02	knowledge of stressing sequence
E-12.01.03	knowledge of limitations of equipment
E-12.01.04	knowledge of power supplies
E-12.01.05	ability to position equipment
E-12.01.06	ability to connect components
E-12.01.07	ability to inspect equipment

Sub-task**E-12.02 Tensions tendons.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

E-12.02.01 knowledge of stressing sequence and procedures
E-12.02.02 knowledge of standards and specifications of stressing equipment
E-12.02.03 knowledge of potential deficiencies of tendons
E-12.02.04 knowledge of gauge and elongation tolerance
E-12.02.05 knowledge of tendon locking methods
E-12.02.06 knowledge of methods of restricting access to work zones
E-12.02.07 ability to connect stressing equipment to tendons
E-12.02.08 ability to operate stressing equipment
E-12.02.09 ability to document elongation and gauge reading
E-12.02.10 ability to identify and rectify potential hazards such as equipment failure,
material failure and danger zones

Sub-task**E-12.03 Cuts and caps tendons.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

E-12.03.01 knowledge of standards and procedures
E-12.03.02 knowledge of cutting methods
E-12.03.03 knowledge of capping methods
E-12.03.04 ability to read, interpret and apply specifications
E-12.03.05 ability to operate cutting equipment
E-12.03.06 ability to secure caps to anchors

Sub-task**E-12.04 Removes stressing equipment.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

E-12.04.01 knowledge of dismantling and disconnecting procedures
E-12.04.02 knowledge of storage procedures
E-12.04.03 knowledge of methods of disconnecting equipment from tendons
E-12.04.04 ability to troubleshoot hung up jack
E-12.04.05 ability to disconnect equipment from tendons
E-12.04.06 ability to clean and maintain equipment
E-12.04.07 ability to store equipment

Sub-task**E-12.05 De-stresses tendons.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

E-12.05.01 knowledge of engineered procedures and specifications
E-12.05.02 knowledge of methods of restricting access to work zones
E-12.05.03 knowledge of possible structure failure during de-stressing procedure
E-12.05.04 ability to identify and rectify potential hazards such as equipment failure, material failure and danger zones

Task 13**Grouts tendons.**

Related Components (including, but not limited to) Grout, water, admixtures, grout tubes and caps, tie wire, duct tape.

Tools and Equipment Compressor, hand tools, cleaning equipment (scrapers, wire brushes, hammers), PPE (respirators, rubber gloves, goggles, protective clothing), grouting machine, hoisting and rigging equipment, buckets, safety barriers, screens, hoses (grout, air, water), generator, power cords, knife, grease gun, communication equipment, tarps.
Also see Appendix A.

Sub-task

E-13.01 Sets up grouting equipment.

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	no	yes	ND	NV	yes	NV	yes	yes	ND	ND	ND

Supporting Knowledge and Abilities

E-13.01.01	knowledge of types of grouting equipment
E-13.01.02	knowledge of grouting procedures
E-13.01.03	knowledge of equipment inspection procedures
E-13.01.04	knowledge of types of testing equipment
E-13.01.05	knowledge of material storage procedures
E-13.01.06	ability to organize material and equipment
E-13.01.07	ability to clean and maintain equipment
E-13.01.08	ability to troubleshoot grouting systems
E-13.01.09	ability to test systems and equipment

Sub-task**E-13.02 Installs grouts.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	no	no	ND	NV	yes	NV	yes	yes	ND	ND	ND

Supporting Knowledge and Abilities

E-13.02.01	knowledge of grouting procedures
E-13.02.02	knowledge of measuring quantities and ratios
E-13.02.03	knowledge of types of grouting equipment
E-13.02.04	knowledge of environmental concerns of grouting
E-13.02.05	knowledge of sequence of mixing
E-13.02.06	knowledge of cleaning and maintaining procedures
E-13.02.07	ability to identify and rectify obstructions in ducts and hoses
E-13.02.08	ability to operate grouting equipment
E-13.02.09	ability to maintain grouting equipment
E-13.02.10	ability to use precision instruments to set machines

Trends

The occupation has seen steady advancements in the development of safer work environments. Pre-assembled, modular and composite components are becoming common in the occupation. Hi-tech machine movers with greater precision are also a factor in the changes taking place within the occupation.

Task 14**Installs primary and secondary structural members.****Related Components (including, but not limited to)**

Steel members (I and H beams, angles, channels, trusses, tees, columns, girts, joists, Hollow Structural Sections [HSS] tubing, decking [Q]), precast members (panels, beams, columns, single tees, double tees, American Association of State Highway and Transportation Officials [AASHTO] beams and joists), glue-lam beams, composite members, seismic reinforcement supports, corrugated metal decking.

Tools and Equipment

Cables, connectors, sledge hammer, turnbuckles, wire rope, surveying instruments, impact gun, pins (drift, bull), welding machine, clip wrench, rigging hardware, spud wrench, sleever bars, torch, cable clips, plumb bob, come-along, reamer, wedges and jacks, chain fall, clamps, scaffolding, timble.

Also see Appendix A.

Sub-task**F-14.01 Erects falsework.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	yes	yes	ND	NV	yes	NV	yes	yes	ND	ND	ND

Supporting Knowledge and Abilities

F-14.01.01	knowledge of types and applications of falsework
F-14.01.02	knowledge of supports and bracing
F-14.01.03	knowledge of capacity and limitations of falsework
F-14.01.04	ability to determine need for falsework
F-14.01.05	ability to determine location of falsework

F-14.01.06	ability to lay out and construct falsework
F-14.01.07	ability to place and secure falsework

Sub-task

F-14.02 Attaches structural members.

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

F-14.02.01	knowledge of types of structural members
F-14.02.02	knowledge of crane signals
F-14.02.03	knowledge of types of bolts and pins
F-14.02.04	knowledge of installation techniques and methods
F-14.02.05	knowledge of tools and equipment capabilities
F-14.02.06	ability to manoeuvre at heights
F-14.02.07	ability to fit, place and modify members
F-14.02.08	ability to determine minimum fastening requirements to secure the member

Sub-task

F-14.03 Levels, plumbs and aligns structural members.

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

F-14.03.01	knowledge of plumbing and alignment equipment such as cables and surveying equipment
F-14.03.02	knowledge of plumbing and aligning techniques and tolerances
F-14.03.03	knowledge of temporary bracing techniques
F-14.03.04	ability to attach tools and equipment such as cables, jacks and temporary bracing
F-14.03.05	ability to set up and use surveying equipment such as levels, plumb bobs, transits and laser levels

- F-14.03.06 ability to determine direction of pull or push
- F-14.03.07 ability to place shims to the desired elevation

Sub-task

F-14.04 Completes installation of structural members.

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

- F-14.04.01 knowledge of welding, fitting, tensioning and tightening procedures and practices
- F-14.04.02 knowledge of installation of fasteners
- F-14.04.03 knowledge of specifications and tolerances such as for welding and torque
- F-14.04.04 ability to tension bolts
- F-14.04.05 ability to align holes using equipment such as pins, bars and reamers
- F-14.04.06 ability to fabricate connections in place
- F-14.04.07 ability to select fasteners
- F-14.04.08 ability to fit and weld members

Task 15**Installs ornamental components and systems.****Related Components (including, but not limited to)**

Steel members (I and H beams, angles, channels, trusses, tees, columns, girts, joists, HSS tubing, decking [Q]), precast members (panels, beams, columns, single and double tee, joists), timber products, composite members, curtain walls, masonry support lintels, seismic reinforcement supports, stairs (structural and ornamental), hand rails, finishing products, coverings.

Tools and Equipment

Hand tools, cables, connectors, turnbuckles, wire rope, surveying instruments, impact gun, pins (drift, bull), welding machine, clip wrench, rigging hardware, spud wrench, sleever bars, torch, cable clips, plumb bob, come-along, reamer, wedges and jacks, chain fall, clamps, scaffolding, squares, ratchet set, level, tap and dies, grinder, rivet gun, caulking, sealant, shims.

Also see Appendix A.

Sub-task**F-15.01 Installs curtain walls and window walls.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>no</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

- F-15.01.01 knowledge of types of window walls and curtain walls
- F-15.01.02 knowledge of curtain wall and window wall installation procedures
- F-15.01.03 knowledge of sealants
- F-15.01.04 knowledge of layout procedures
- F-15.01.05 knowledge of glazing techniques
- F-15.01.06 ability to establish benchmarks and control lines
- F-15.01.07 ability to apply sealants
- F-15.01.08 ability to install as per specifications

Sub-task**F-15.02 Installs miscellaneous components.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

F-15.02.01	knowledge of types of miscellaneous components such as stairs, railings and coverings
F-15.02.02	knowledge of miscellaneous component installation procedures
F-15.02.03	ability to determine installation sequence such as sub-assembly and order of installation
F-15.02.04	ability to fit, weld and finish a variety of materials
F-15.02.05	ability to field-fabricate and modify components
F-15.02.06	ability to follow manufacturers' specifications
F-15.02.07	ability to finish installation such as polishing and painting

Task 16**Installs conveyors, machinery and equipment.**

Related Components (including, but not limited to)	Crushers, conveyors, ball mills, guards, rollers, hydraulic gantries, jacking towers, multi-bearing rollers, belts, platework, bearings, pillow block, trunions, hangers, rails, chains, floats, supports, headers, take-ups, chutes, vessels, hoppers, tanks, bins, lubricants.
Tools and Equipment	Multi-roller, hydraulic jacks, track jacks, pry bar, rolling hardware and equipment such as chain falls, come-alongs, slings, air cushions, shackles, softeners, welding equipment, winches, blocks, rope, surveying equipment, cable tugger, key plates, hammers, forklift, carry deck, strong back, clamps, dogs. Also see Appendix A.

Sub-task**F-16.01 Installs material handling systems.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
yes	yes	yes	yes	ND	NV	yes	NV	yes	yes	ND	ND	ND

Supporting Knowledge and Abilities

F-16.01.01	knowledge of types of material handling systems and components
F-16.01.02	knowledge of material handling installation procedures
F-16.01.03	ability to assemble components
F-16.01.04	ability to sequence installation of various components such as supports, headers and rails
F-16.01.05	ability to establish work points with surveying equipment

Sub-task**F-16.02 Aligns material handling systems.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

F-16.02.01	knowledge of specifications and tolerances
F-16.02.02	knowledge of methods of alignment
F-16.02.03	ability to determine tolerances from drawings to verify locations
F-16.02.04	ability to use precision tools and measuring instruments
F-16.02.05	ability to transfer benchmarks and control lines
F-16.02.06	ability to rig and jack components to specifications
F-16.02.07	ability to troubleshoot for defects and malfunctions
F-16.02.08	ability to secure components

Sub-task**F-16.03 Places machinery and equipment.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

F-16.03.01	knowledge of types of machinery and equipment
F-16.03.02	knowledge of machinery installation procedures
F-16.03.03	knowledge of specifications and tolerances
F-16.03.04	ability to determine weights of machines and components
F-16.03.05	ability to assemble components of machinery
F-16.03.06	ability to insert shims and use adjusting screws for setting and levelling
F-16.03.07	ability to assess best travel path
F-16.03.08	ability to transfer loads to various floats and rollers
F-16.03.09	ability to determine centre of gravity
F-16.03.10	ability to use precision instruments to set machines

Trends

The occupation has seen an increased awareness for the need to develop and implement techniques for reuse and recycling of dismantled structural, mechanical and miscellaneous components.

The occupation continues to promote safe working conditions by raising the level of awareness of environmental hazards such as asbestos and silica.

Task 17**Repairs components.**

Related Components (including, but not limited to)

Structural, mechanical and finishing.

Tools and Equipment

See Appendix A.

Sub-task**G-17.01 Assesses current condition of components.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

- G-17.01.01 knowledge of manufacturers' specifications
- G-17.01.02 knowledge of policies and procedures
- G-17.01.03 ability to confirm components meet specifications
- G-17.01.04 ability to communicate observed defects
- G-17.01.05 ability to use diagnostic tools such as callipers and torque wrenches

Sub-task**G-17.02 Field-fabricates components.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

G-17.02.01 knowledge of layout techniques
G-17.02.02 knowledge of manufacturers' specifications
G-17.02.03 knowledge of policies and procedures
G-17.02.04 ability to fabricate and fit components

Sub-task**G-17.03 Replaces components.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

G-17.03.01 knowledge of policies and regulations
G-17.03.02 knowledge of removal techniques
G-17.03.03 knowledge of installation techniques
G-17.03.04 knowledge of temporary and permanent support techniques
G-17.03.05 ability to remove defective components
G-17.03.06 ability to install replacement components
G-17.03.07 ability to verify conditions of repair
G-17.03.08 ability to install temporary and permanent supports

Sub-task**G-17.04 Performs preventative maintenance.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

G-17.04.01	knowledge of manufacturers' specifications
G-17.04.02	knowledge of policies and procedures
G-17.04.03	knowledge of material used such as reinforcing, lubrication and hard surfacing
G-17.04.04	knowledge of maintenance log and schedule
G-17.04.05	knowledge of maintenance techniques
G-17.04.06	ability to interpret maintenance schedules
G-17.04.07	ability to perform maintenance techniques such as reinforcing, lubrication and hard surfacing

Task 18**Dismantles and removes structural, mechanical and miscellaneous components.**

Related Components (including, but not limited to) Structural, mechanical and finishing

Tools and Equipment See Appendix A.

Sub-task

G-18.01 Ensures decommissioning of structure or components.

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

G-18.01.01 knowledge of policies and procedures such as lock-out, tagging procedures, hot work procedures and WHMIS

G-18.01.02 knowledge of sequence of decommissioning

G-18.01.03 knowledge of temporary support techniques

G-18.01.04 ability to review decommissioning documentation and keep records

Sub-task

G-18.02 Plans sequence of disassembly.

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

G-18.02.01 knowledge of disassembly sequence

G-18.02.02 knowledge of disassembly techniques

G-18.02.03 knowledge of temporary support techniques

G-18.02.04 ability to determine and prioritize required tasks

Sub-task**G-18.03 Removes components.**

<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>
<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>NV</u>	<u>yes</u>	<u>NV</u>	<u>yes</u>	<u>yes</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>

Supporting Knowledge and Abilities

G-18.03.01	knowledge of sequence of tasks
G-18.03.02	knowledge of storage and placement of components
G-18.03.03	knowledge of stored energy and dynamic loads within the structure
G-18.03.04	ability to follow sequence of disassembly

APPENDICES

Hand Tools

adjustable wrench	measuring tape
aligning bar (sleever bar)	needle nose pliers
allen key set	nut drivers
B&O hammer	pins (drift, bull)
bar clamps	pipe cutters
beam clamps	pipe wrench
bolt bag	pliers
bolt cutters	prybar
button pump	punch
cable cutters	reamers
centre punch	reel holder
chalk line	rod bag
chipping hammer	scrapers
cold chisel	screwdrivers — Robertson;
combination square	Phillips, flat blades
combination wrench set	shears
drill bits	side/diagonal cutters
files	sledge hammer
finger clamps	slip joint pliers
flashlight	socket set
grease gun	spud wrench
hack saw	tap set
hammers	tarps
hickey bar	tie wire reel
hoses (grout, air, water)	tin snips
knives	tool belt
knocker wrench	tool bucket
marlinspike	wire brush

Safety Equipment

air movers (fans)	perimeter cables
anchor points	portable lighting
cables	ropes (fibre, wire)
eye wash facilities	safety barriers
fire blankets	screens
fire extinguishers	signage
first aid equipment	stanchion posts
fume and toxic gas detector	warning tape
guard rails	welding flash screens
life lines	

Personal Protective Equipment (PPE)

breathable air pack	respirators
chin straps	retractable lanyard
coveralls (fire retardant)	rope grabs
ear plugs	rubber gloves
face shields	safety belt
fall arresters	safety glasses
full body harness	safety vest
gloves	steel toe boots
goggles	welding apron
hard hat	welding gloves
insulated gloves	welding helmet
knee pads	welding jacket
lock-out kit	welding shield

Power Tools and Equipment

air chisel	peening tool
band saw	pencil grinder
chop saw	percussion drill
circular saw	pneumatic gun
compressor	porta band
disk	powder-actuated tool
electric hacksaw	power bender
gas cut-off saw	power cords
gas deck saw	power drill
generator	power wrench
grinder	reciprocating saw
grouting machine	rivet buster
hammer drill	riveting gun
hydraulic jacks (and accessories)	tension control gun
impact drill	
impact gun	
mag drill	

Measuring and Layout Equipment

bevel squares	measuring tape
builders level	optical levels
chalk	paint pen
chalk line	pencil
crayon	piano wire
distometers	plumb line
laser level	prism
laser square	rod level
measuring chain	scale

Measuring and Layout Equipment (continued)

soapstone	theodolite
spirit levels	total station
spraypaint	torpedo level
squares (framing, combination)	transit
straight edges	tripods
string line	water level

Specialty Tools and Equipment (Welding and Cutting Tools)

air lance	radiograph
arc air (gouger)	stud welding equipment
arc welding machine	stud welding gun
chipping hammer	submerged arc machine
cutting tools (oxygen, acetylene, propane)	thermal cutting machine
plasma cutter	thermite welding machine
	tiger torch

Scaffolding and Access Equipment

aerial work platforms	ladder jack scaffolds
aluminium framed platform	ladders
aluminium planks	mechanical scaffolds
boom lifts	ramps
bosun chair	rolling scaffolds
electrical articulated boom lift	sawhorses
electrical scissor lifts	scissor-lift
electrical vertical lifts	stationary scaffolds
end frames	stepladders
extension ladder	swing stages
floats (angel's wings)	temporary access/freight elevator
gas powered articulated boom lift	tube and clamps
gas powered scissor lifts	

Rigging Equipment

balance beam	ring and lines
beam clamps	rope clips
binders	shackles
blocks	sheaves
bridle hitch	simple roller
cable clamps	softeners
chain	spreader beam
chain falls	spreaders
clips	swivel
come-alongs	synthetic slings
dunnage	tackle blocks
equalizer beam	tag lines
eye bolts	thimbles
fibre rope	Tirfor® (cable puller)
guide lines	tugger
hooks	turnbuckles
mechanical/hydraulic jacks	Vernier calipers
multi-bearing rollers	wedge sockets
multiple-leg bridle sling	winches
	wire rope
	wire rope slings

Handling Equipment

boom trucks	pallet jack
cradle	power cups
forklifts (telescopic, electric, gas powered)	rollers
glass cups	stretcher
multi-bearing rollers	tugger

Pre-stresses/Post-tensioning Equipment

cable feeder	heat shrink
carousel	knife
caulking	mono-strand jack
centre-hole jack	multi-strand jack
de-tensioning stool	pocket shear
duct tape	pump
gauges	seating tools
grease	sheath cutting tool
grout machine	troubleshooting anchor

accessories	items used in conjunctions with reinforcing steel such as bar chairs, slab bolsters, etc.
curtain wall	an enclosing wall which provides no structural support
dunnage	wooden boards and timbers used to hold material in place when being transported
falsework	temporary steel or wooden supports upon which final steel is erected
girts	horizontal or vertical framing member to which sash, siding or other finished material is attached
grating	an arrangement of parallel or latticed bars which serve as the floor of a platform, walkway, etc.
miscellaneous iron products	any steel product or component that is not main structural supporting member
ornamental components	non-structural steel, precast or composite members

AASHTO	American Association of State Highway and Transportation Officials
ANSI	American National Standards Institute
CRSI	Concrete Reinforcing Steel Institute
CSA	Canadian Standards Association
CWB	Canadian Welding Bureau
HSS	Hollow Structural Section
JHA	Job hazard analysis
OH&S	Occupational Health and Safety
PPE	personal protective equipment
PTI	Post Tensioning Institute
RSIC	Reinforcing Steel Institute of Canada
THA	Task hazard analysis
WHMIS	Workplace Hazardous Materials Information System

APPENDIX D**BLOCK AND TASK WEIGHTING****BLOCK A OCCUPATIONAL SKILLS**

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	National Average
%	17	13	15	5	ND	NV	20	NV	12	10	ND	ND	ND	13%

Task 1 Interprets occupational documentation.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	24%
%	28	25	10	26	ND	NV	20	NV	30	30	ND	ND	ND	

Task 2 Communicates in the workplace.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	14%
%	21	10	5	21	ND	NV	20	NV	10	10	ND	ND	ND	

Task 3 Uses and maintains tools and equipment.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	35%
%	29	35	35	27	ND	NV	40	NV	50	30	ND	ND	ND	

Task 4 Organizes work.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	27%
%	22	30	50	26	ND	NV	20	NV	10	30	ND	ND	ND	

BLOCK B RIGGING AND HOISTING

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	National Average
%	14	20	20	21	ND	NV	20	NV	10	20	ND	ND	ND	18%

Task 5 Selects rigging equipment.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	47%
%	50	50	50	46	ND	NV	40	NV	50	40	ND	ND	ND	

Task 6 Uses hoisting and lifting equipment.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	50	50	50	54	ND	NV	60	NV	50	60	ND	ND	ND	53%

BLOCK C CRANES

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	National Average
%	13	10	10	10	ND	NV	5	NV	8	8	ND	ND	ND	9%

Task 7 Selects, assembles and erects cranes and components.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	53	60	50	53	ND	NV	50	NV	65	80	ND	ND	ND	59%

Task 8 Disassembles cranes.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	47	40	50	47	ND	NV	50	NV	35	20	ND	ND	ND	41%

BLOCK D REINFORCING

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	National Average
%	16	10	15	9	ND	NV	20	NV	25	20	ND	ND	ND	16%

Task 9 Fabricates on-site.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	33	30	40	51	ND	NV	30	NV	10	30	ND	ND	ND	32%

Task 10 Installs reinforcing material.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	
%	67	70	60	49	ND	NV	70	NV	90	70	ND	ND	ND	68%

BLOCK E PRE-STRESSES/POST-TENSIONS

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	National Average
%	10	5	5	8	ND	NV	5	NV	5	10	ND	ND	ND	7%

Task 11 Places pre-stressed/post-tensioning systems.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	45%
%	47	50	50	26	ND	NV	40	NV	45	60	ND	ND	ND	

Task 12 Stresses tendons.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	41%
%	36	40	50	56	ND	NV	40	NV	35	30	ND	ND	ND	

Task 13 Grouts tendons.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	14%
%	17	10	0	18	ND	NV	20	NV	20	10	ND	ND	ND	

BLOCK F ERECTION, ASSEMBLY AND INSTALLATION

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	National Average
%	17	37	25	34	ND	NV	20	NV	35	27	ND	ND	ND	28%

Task 14 Installs primary and secondary structural members.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	51%
%	44	50	50	30	ND	NV	60	NV	60	65	ND	ND	ND	

Task 15 Installs ornamental components and systems.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	27%
%	27	30	30	27	ND	NV	25	NV	30	20	ND	ND	ND	

Task 16 Installs conveyors, machinery and equipment.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	22%
%	29	20	20	43	ND	NV	15	NV	10	15	ND	ND	ND	

BLOCK G MAINTENANCE AND UPGRADING

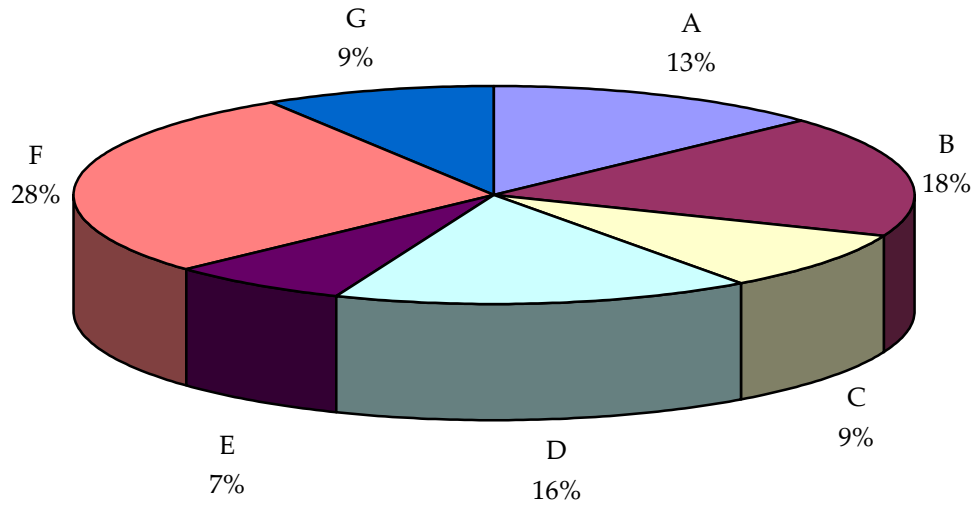
	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	National Average
%	13	5	10	13	ND	NV	10	NV	5	5	ND	ND	ND	9%

Task 17 Repairs components.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	44%
%	31	40	30	44	ND	NV	50	NV	50	60	ND	ND	ND	

Task 18 Dismantles and removes structural, mechanical and miscellaneous components.

	<u>NL</u>	<u>NS</u>	<u>PE</u>	<u>NB</u>	<u>QC</u>	<u>ON</u>	<u>MB</u>	<u>SK</u>	<u>AB</u>	<u>BC</u>	<u>NT</u>	<u>YT</u>	<u>NU</u>	56%
%	69	60	70	56	ND	NV	50	NV	50	40	ND	ND	ND	



TITLES OF BLOCKS

BLOCK A	Occupational Skills	BLOCK E	Pre-Stresses/Post-Tensions
BLOCK B	Rigging and Hoisting	BLOCK F	Erection, Assembly and Installation
BLOCK C	Cranes	BLOCK G	Maintenance and Upgrading
BLOCK D	Reinforcing		

*Average percentage of the total number of questions on an interprovincial examination, assigned to assess each block of the analysis, as derived from the collective input from workers within the occupation from all areas of Canada. The Interprovincial examination for this trade has 120 questions.

BLOCKS	TASKS	SUB-TASKS				
A - OCCUPATIONAL SKILLS	1. Interprets occupational documentation.	1.01 Interprets drawings and specifications.	1.02 Interprets standards, regulations and procedures.			
	2. Communicates in the workplace.	2.01 Communicates with co-workers.	2.02 Communicates with others.	2.03 Communicates with apprentices.	2.04 Uses hand signals.	2.05 Communicates electronically.
	3. Uses and maintains tools and equipment.	3.01 Uses hand tools and measuring equipment.	3.02 Uses power tools.	3.03 Uses bending tools and equipment.	3.04 Uses powder-actuated tools.	3.05 Uses aerial work platforms.
		3.06 Uses ladders.	3.07 Uses scaffolding.	3.08 Uses personal protective equipment (PPE).	3.09 Uses surveying equipment.	3.10 Uses welding equipment.
		3.11 Uses thermal and oxy-fuel cutting equipment.				
		4. Organizes work.	4.01 Organizes materials and supplies.	4.02 Marks layouts.	4.03 Maintains safe work environment.	4.04 Assesses site hazards.
B - RIGGING AND HOISTING	5. Selects rigging equipment.	5.01 Matches load to lift capability.	5.02 Inspects rigging equipment.	5.03 Maintains rigging equipment.		
	6. Uses hoisting and lifting equipment.	6.01 Uses hoisting equipment.	6.02 Uses lifting equipment.	6.03 Attaches rigging to load.		

BLOCKS	TASKS	SUB-TASKS				
C - CRANES	7. Select, assemble and erect cranes and components.	7.01 Assesses crane site limitations.	7.02 Determines crane position.	7.03 Prepares bases.	7.04 Erect crane and components..	
	8. Disassembles cranes.	8.01 Disassembles crane components.	8.02 Prepares crane and components for transport.			
D - REINFORCING	9. Fabricates on-site.	9.01 Cuts material.	9.02 Bends material.			
	10. Installs reinforcing material.	10.01 Places reinforcing material.	10.02 Ties material.	10.03 Joins material.		
E - PRE-STRESSES/ POST-TENSIONS	11. Places pre-stressed/post-tensioning systems.	11.01 Lays out profile.	11.02 Places tendons and accessories.	11.03 Installs bursting steel and anchorages.	11.04 Connects tendons to anchors.	11.05 Protects exposed tendons.
	12. Stresses tendons.	12.01 Sets up stressing equipment.	12.02 Tensions tendons.	12.03 Cuts and caps tendons.	12.04 Removes stressing equipment.	12.05 De-stresses tendons.
	13. Grouts tendons.	13.01 Sets up grouting equipment.	13.02 Installs grouts.			
F - ERECTION, ASSEMBLY AND INSTALLATION	14. Installs primary and secondary structural members.	14.01 Erects falsework.	14.02 Attaches structural members.	14.03 Levels, plumbs and aligns structural members.	14.04 Completes installation of structural members.	
	15. Installs ornamental components and systems.	15.01 Installs curtain walls and window walls.	15.02 Installs miscellaneous components.			

BLOCKS	TASKS	SUB-TASKS			
G - MAINTENANCE AND UPGRADING	16. Installs conveyors, machinery and equipment.	16.01 Installs material handling systems.	16.02 Aligns material handling systems.	16.03 Places machinery and equipment.	
	17. Repairs components.	17.01 Assesses current condition of components.	17.02 Field-fabricates components.	17.03 Replaces components.	17.04 Performs preventative maintenance.
	18. Dismantles and removes structural, mechanical and miscellaneous components.	18.01 Ensures decommissioning of structure or components.	18.02 Plans sequence of disassembly.	18.03 Removes components.	